3.4.5 Training

Neustar will increase and enhance the amount of training material and resources available to customers via the NPAC Portal. Highlights Include:

- An NPAC/SMS knowledge base that includes comprehensive online training modules, troubleshooting information, process and procedure manuals, and white papers
- All knowledge base materials, including NPAC/SMS training modules, will be accessible to authorized Users free of charge
- Training modules will cover all common NPAC/SMS functions
- On-location training (either at Neustar's training location or at the customer's premises) will be available using a simplified "service family" approach that applies the same standard rate of HIGHLY CONFI per session (plus expenses) for all types of on-location training
- The HIGHLY CONFI fee covers up to HIGHLY CONFIDE attendees per training session

Neustar's proposal for Training Charges is set forth in Table 3-13.

Table 3-13 Training Charges

Charges	Description	Unit	Price	Billing Frequency
In-person training (per training session)	Single rate per session for up to 10 attendees (generally 1.5 days)	Per Session	HIGHLY CONFIDENTIAL	As incurred

3.5 Enhanced Guarantees

Neustar proposes to substantially increase the Industry's financial guarantees and protections. These guarantees involve three areas that are described below in greater detail. First, Proposal Section 3.5.1 describes Neustar's commitment to increase the dollar and percentage amounts of performance credits related to Service Level Requirements (SLR) and the Gateway Evaluation Process (GEP) referenced in RFP Sections 9 and 4.1, respectively. These proposed penalty increases are consistent with the increased technical and operational performance commitments of the quoted RFP sections. Second, Proposal Section 3.5.2 describes a HIGHL increase in the amounts of the performance bonds we will offer to the Industry in response to VQS Question 3.6.3. Third, Neustar agrees to eliminate Revenue Recovery Collections, protecting the Industry from bad debt associated with allocable charges (RFP Sections 13.4 and 14.2). Fourth, as described in Proposal Section 1.4, Neustar will implement and/or upgrade several new performance and security audits that further ensure the Industry is protected from the growing threat of IT security breaches.

3.5.1 Performance Credits and GEP Price Reductions

The Master Agreement's SLRs and GEP provide financial assurance to the Industry that the LNPA will perform in accordance with stringent requirements for NPAC/SMS service and interface availability. Metrics and credits/reductions are set at levels that demand outstanding performance. Because operational execution is the primary consideration in assessing LNPA performance, the Industry associated severe penalties to missing one or more metrics.

Neustar proposes to more than HIGHLY CONFI our exposure for SLR Performance Credits and increasing GEP Price Reductions by approximately HIGHLY C. Under this Proposal, Neustar's exposure will exceed HIGHLY CONFIDENTI per month for failure to meet SLR and GEP requirements.

Neustar's proposed changes to SLR Performance Credits and GEP Penalties are summarized and illustrated in Exhibit 3-4.

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The increased requirements of the 2015 LNPA RFP are significant; e.g., several requirements (including Service and Interface Availability) require a tenfold increase in performance (i.e., 99.99%) from the requirements set forth in the current Master Agreement. A key change in the GEP for Elements 1a, 1b, 2, and 3 is the elimination of the "3 strikes rule". These GEPs currently generate penalties only if Neustar misses the required metrics three times in a given year (or two months in a row). Under the terms of the RFP, this flexibility has been eliminated and all GEP misses will result in a penalty. The RFP's stringent requirements, which include 99.99% Service Availability, combined with removal of "3 strikes", and high penalty rates, sends a clear message that LNPA service performance is of utmost importance to the Industry. Neustar supports this direction and is confident we will continue to provide exceptional performance.

Neustar is confident in our ability to exceed the Industry's performance expectations, steadily improving operational performance to the point where our reliability is never in doubt. Over the last 32 quarters the Industry and Neustar have effectively managed risk out of the LNP process.

Neustar's proposal for new SLR Performance Credits is set forth in Table 3-14.

Table 3-14 SLR Performance Credits: Current vs. Proposed

		Per Region	
RFP SLR	SLR Title	Current Monthly Penalty	Proposed Monthly Penalty
[redacted]			
SLR 2	Scheduled Service Unavailability	$5,000	$10,000
[redacted]			
SLR 4	LSMS Broadcast Time	$5,000	$10,000
[redacted]			
SLR 6	LSMS to NPAC Interface Transaction Rates	$5,000	$10,000
[redacted]			
SLR 8	Unscheduled Backup Cutover Time	$5,000	$10,000
[redacted]			
SLR 10	NPAC/ SMS Full Disaster Restoral Interval	$5,000	$10,000
	Maximum Monthly SLR Penalties	**$63,000**	**$130,000**

Neustar's proposal for new GEP Price Reductions is set forth in Table 3-15.

Table 3-15 GEP Price Reductions: Current vs. Proposed

Percentage of monthly net allocated Industry charges		*Per Region*	
RFP GEP	GEP Title	Current Monthly Penalty	Proposed Monthly Penalty
[redacted]	[redacted]	HIGHLY CONFID	
GEP 1b	Partial Service Unavailability	HIGHLY CONFIDENTIAL	
[redacted]	[redacted]	HIGHLY CONFID	
GEP 2	Report Satisfaction	HIGHLY CONFIDENTIAL	
[redacted]	[redacted]	HIGHLY CONFID	
GEP 4	Benchmarking Satisfaction	HIGHLY CONFIDENTIAL	
[redacted]	[redacted]	HIGHLY CONFID	
GEP 6	Problem Escalation	HIGHLY CONFIDENTIAL	
[redacted]	[redacted]	HIGHLY CONFID	
GEP 7b	Billing Accuracy	HIGHLY CONFIDENTIAL	
	Maximum Monthly GEP Penalties	HIGHLY CONFIDENTIAL	

3.5.2 Performance Bonds

In the unlikely event Neustar is unable to serve as the LNPA, performance bonds provide protection to the Industry. Payments under the bond will serve as partial compensation for losses sustained by the Industry in such a case.

Throughout the term of the current contract, Neustar has maintained one performance bond per region in the amount of HIGHLY CONFIDENTIAL (total of HIGHLY CONFIDENTIAL for all U.S. regions). NPAC/SMS activity has increased by several orders of magnitude since the performance bonds were originally executed. In 2012, amounts under performance bonds equaled less than one week of allocated NPAC/SMS charges. Given our commitment to lowering Industry risk via guaranteed performance, Neustar proposes to increase significantly the amounts available under its performance bonds for the new term of the Master Agreement from HIGHLY CONFIDENTIAL HIGHLY CONFIDENTIAL per region) to HIGHLY CONFIDENTIAL HIGHLY CONFIDENTIAL per region). The new amount equates to approximately HIGHLY days of allocated charges. We have a commitment in place from HIGHLY CONFIDENTIAL The Commitment Letter is attached in Tab "Performance Bond Commitment Letter".

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3.5.3 Collections Certainty

Neustar will eliminate Revenue Recovery Collections ("RRC"). RRC is the mechanism that currently allows the LNPA to charge the Industry for estimated bad debt expense, via a reserve. By removing the RRC Neustar will create additional cost certainty for the Industry by eliminating bad debt exposure associated with Allocable Charges, and comply with RFP Sections 13.4 and 14.2, subject to specific mechanics and limits to be defined in the Master Agreement.

Neustar will also reduce allocable charges by the amount of collected charges from Users not subject to allocable charges. This provision complies with RFP Sections 13.4 and 14.2 and is also subject to the specific mechanics and limits to be defined in the Master Agreement.

3.5.4 Mitigation of Performance and Information Risk

Neustar recognizes the importance of providing the Industry with state-of-the-art security management and quality of service audits. Many performance and security audit measures have long been in place, and Neustar has performed exceptionally well. However, in the interest of further enhancing our performance and leaving no stone unturned in the interest of protecting our Service and our customers from impairments that can lead to serious breaches, Neustar proposes to implement and/or upgrade the following additional compliance audits: TL9000 (upgrade to ISO 9001), ISO/IEC 27001, and ISO 22301. A complete discussion of Neustar's current and future plans in regard to these certifications can be found in Proposal Section 1.4.

3.6 National Solution

Transition costs should always be a significant element when considering the selection of a new vendor. In the case of LNP, transition costs should be a primary consideration because LNPA transition would present an unprecedented and exceptionally complex system migration affecting each and every Service Provider. Conservatively, the transition costs associated with LNP transition are estimated at $719 million in the first year alone.

A regional LNPA solution creates even more complexity. All costs associated with a national transition apply, plus additional inefficiencies from a multi-vendor environment. Additional costs include end-to-end testing for two LNPAs, and ongoing connectivity and administration costs. Neustar estimates that the cost of implementing a second LNPA for a single region is over HIGHLY CON greater than the proportional cost of a national transition.

The Industry is undergoing significant technology and service evolution. Technology changes, consumer service portfolios, and the need for wireless networks to efficiently transport IP calls and data (e.g. Voice over LTE) are strategic priorities for the Industry. The LNPA service is a critical element of this change, and services developed and operated by Neustar today will be needed to support countless customer turn-ups, technology migrations, network consolidations, and policy executions over the next ten years

Given Neustar's outstanding track record, the risk of transition is an unnecessary and untimely undertaking, particularly for a first-time complex migration affecting a wide-reaching and myriad set of interconnected systems. Transition issues and failures will necessarily distract Service Providers from their primary objective – evolving and competing in a marketplace that is experiencing tremendous change. Selecting Neustar avoids any risk of transition and ensures Industry resources can be focused on strategic priorities.

Proposal Section 1.6 addresses transition risks and costs in detail.

Following are two discussions of transition issues and costs:

- Proposal Section 3.6.1 addresses national transition costs in the event of a transition to a new nationwide LNPA
- Proposal Section 3.6.2 details the only reasonable approach to LNP administration in the U.S. is a Full Combined Propsal.

3.6.1 National Transition Costs

Navigant Economics, an economics and consulting firm, has completed a comprehensive analysis of the costs associated with LNP transition in a report entitled, "Estimating the Costs Associated with a Change in Local Number Portability Administration". The report estimated a national LNPA transition would result in approximately $719 million in quantifiable year-one transition costs as a result of increased LNPA error rates and the significant level of required testing by Service Providers. If extrapolated over multiple years the total impact would exceed $1 billion. This report can be found in the Proposal Attachments section of our Proposal (RFP Section 15.1, "*Optional Attachments*" in the IASTA Tool).

The primary reason for such a high transition cost is the sheer scope of the transition itself.

- At the time of Navigant's study, the NPAC/SMS contained approximately 5.2 billion populated data fields for 560 million SV records (the database has since grown by 10%). Each populated field refers to an aspect of an individual end user's communications service. Any data that is not copied or interpreted correctly by the new LNPA is likely to lead to an end user service failure, and result in a customer service call, engineering research, and possible revenue loss. Database transition would be the first transition impact felt by customers.

- Errors in transaction processing will generate the highest transition impact over an extended period of time. Neustar currently processes over 500 million transactions a year. For every completed transaction there are over 20 CMIP messages passed between various components of the LNPA and Service Provider systems (i.e., 12 billion CMIP messages per year). Neustar's 15 years of LNPA experience plays a significant role in the success of LNP in the U.S.. Many of the NPAC/SMS' transactions consist of modifications of thousands or even millions of records related to a single project (to change a specific field). Neustar's expertise ensures the activity for these projects is properly allocated over several days or weeks and that each transaction is verified end-to-end. In addition, the Industry relies on Neustar to understand exactly how to structure such projects and to know what can and can't be done in the available transaction windows. This requires experience and knowledge that Neustar brings to the table.

- Outages would likely increase both in number and in duration. While the overall impact of these is expected to be less important than the other elements, such incidents would be highly visible, impacting consumer confidence.

- End-to-End testing charges would be significant, involving not only every SOA and LSMS, but every downstream system that relies on NPAC/SMS data.

Navigant's analysis only assessed the potential impacts associated with operational errors, increased system outages, and testing that can be expected from any LNPA transition. The report finds that approximately $719 million in cost would result from 7.1 million end users experiencing a direct impact of an error in year-one, generating 4.8 million incremental complex Service Provider escalations.

Highlights of transition impacts that are detailed in Navigant's paper are found in Table 3-16 and Table 3-17.

Table 3-16 Year-One Costs Resulting from LNPA Transition (in millions)

Year One Costs	Service Credits	Customer Service	Engineering	Total
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Transaction Processing	$49.2	$211.6	$189.6	$450.5
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Testing	$0.0	$0.0	$71.0	$71.0
Total	**$64.5**	**$290.6**	**$363.8**	**$719.0**

Table 3-17 Year-One Customer Impacts Resulting from LNPA Transition (in millions unless otherwise noted)

Error Types	Errors Broadcast to End Users	Errors Impacting End Users	End User Complaints	End User Churn (in thousands)
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Transaction Processing	6.7	5.4	3.5	140
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Customers Impacted	**9.4**	**7.1**	**4.8**	**209**

Potentially eclipsing direct transition costs are the opportunity costs caused by the need to refocus time and money, from strategic innovation and market competition, to crisis management and reestablishing consumer confidence. In summary, selection of Neustar will ensure continued operational performance and zero LNPA transition cost during a critically important era of transformational change in the telecommunications industry.

3.6.2 Full Combined Proposal (Regional Cost Avoidance)

The 2015 LNPA RFP permits respondents to submit proposals for one or more regions individually (each referred to as a "Regional Proposal"), for one or more combinations of regions together, either for fewer than all regions (each referred to as a "Partial Combined Proposal") or for all seven regions (referred to as a "Full Combined Proposal"). Neustar understands the RFP Bid Process Overview listed in RFP Question 14.1 and is proposing only a Full Combined Proposal. Regional and Partial Combined Proposals create unnecessary operational and cost burdens for Service Providers and risks to consumers and should not be considered by the FoNPAC or the FCC.

U.S. LNP Administration is akin to other Industry-wide services, such as NANPA, National PA, USF Billing and Collection, and the operation of Top Level Domain (tLDs) like .COM, .US, .INFO, .BIZ,—all of which have just one vendor performing the function on behalf of a diverse group of constituents. While businesses sometimes engage multiple suppliers for purchasing commodity products, this not a common practice with complex, service-intensive platforms like the NPAC/SMS. The more deeply interconnected the service, the greater the ripple effect from non-uniform behavior, performance, and change management.

U.S. consumers have come to enjoy the benefits of the most efficient porting experience in the world, regardless of where they live. Service providers, for their part, have the benefit of a national standard for new customer acquisition (particularly for major product launches), national pooling, and network management. By selecting more than one LNPA vendor, particularly any vendor that lacks experience, the FoNPAC would introduce the risk that not all U.S. consumers would enjoy the same ease and expedience of porting on a timely and universally-consistent basis as they enjoy today. Such differences in LNPA service quality could impact some Service Providers' ability to compete on an equal footing and lead to increased complaints to regulatory bodies. The impacts of operating in a multi-vendor environment of the NPAC/SMS include, but are not limited to, the following:

- Increased Service Provider effort and cost to connect their SOAs and LSMSs to multiple live LNPA NPAC/SMS platforms and test beds and maintain those multiple connections
- New software release and new Service Provider feature deployment would likely have to be deferred during transition period
- Failover testing likely would have to be deferred during the transition period
- Increased Service Provider cost and risk in receiving services from two different LNPA vendors, including:
  - Help desk services
  - Reporting services
  - New user services
  - Tunable parameter maintenance
  - Service Provider ID migration limitations and process coordination
  - Resolution of differences among LNPA software implementations, some of which could be service-affecting
  - Data and information from multiple LNPAs into one LNPA Working Group website coordination
  - Neutral change management administration
  - Bulk Data Download (BDD) management
  - Unnecessary development of Service Provider internal processes to accommodate differences in multiple LNPA methods & procedures
  - Unnecessary initial change and ongoing support for the LNP Enhanced Analytic Platform (LEAP) accessed by law enforcement and Intermodal Ported TN Identification Service accessed by telemarketers
  - Negotiation, execution, and reconciliation of differences in Master Agreements with multiple LNPAs
  - Ongoing management and oversight of multiple LNPAs by the NANC, NAPM LLC and FCC

During the last 15 years, the Industry has enjoyed the operational and cost benefits of having a single, nationwide LNPA. Given Neustar's proven track record of superior customer service as the current LNPA, an outcome of having multiple LNPA vendors for the new contract term would represent a major step backwards for the Industry and consumers. Service Providers in some or all regions would be subjected to an extraordinarily risky and costly transition. Given the preponderance of Service Providers that operate in more than one region, the costs and risks of transition will be national in scope, even if only one region is identified for transition. In fact, Regional and Partial Combined Proposals will make transition more costly, because Service Providers affected by a transition will have to manage two vendors during the activity.

If multiple LNPA vendors are engaged, all future changes to the NPAC/SMS will be encumbered. For example, two or more LNPA vendors will have to fully understand the requirements pertaining to the future changes and implement these changes simultaneously, and in exactly the same way from an Industry interface perspective; otherwise operational problems will ensue. In order not to give any LNPA vendor an advantage, it is likely that the Industry will have to procure, select, and pay for a separate vendor to perform the change management function at the NANC LNPA Working Group. The charges for this function will have to be allocated, billed and collected.

Given that in a multi-LNPA vendor environment all NPAC/SMSs are likely to have to carry the same functionality, debates over design and implementation schedules will play a larger role and the Industry will be forced to adhere to the limits of the least capable vendor. If one of the LNPA vendors fails to deliver on schedule, Service Providers and consumers in the affected regions will suffer and not receive the benefits in a timely manner—most likely, the Industry will simply be forced to wait until all LNPA vendors are ready to deploy a given change. These types of issues can be particularly problematic if the FCC has mandated the change to LNP by a deadline. If an LNPA appears to be unable to meet a particular deadline, then Service Providers may have to seek regulatory relief from deadlines and, possibly, relief from fines. This was the case in the NPAC/SMS Regions originally assigned to Perot Systems.

By accepting Neustar's Full Combined Proposal, the Industry will receive continued, superior-rated customer service for the vital LNPA function, evenly-applied to the entire nation through the new contract term. By selecting Neustar, the Industry can avoid all of the substantial negatives—operational complexities and increased costs—associated with Regional and Partial Combined Proposals and multiple LNPAs. And, by selecting Neustar, the Industry will receive the benefit from Neustar's planned upgrades and proposed innovation without any transition risk and without subjecting Service Providers and consumers to numerous potential negative and expensive consequences.

3.7 Additional Qualifications

This Proposal is subject to the qualifications set forth below and elsewhere in this Proposal:

1. The implementation of this Proposal is subject to the parties entering into a definitive agreement for the new term of the contracts.

2. A seven year term to run from the conclusion of the current Master Agreements through the date that equals seven years thereafter (currently July 1, 2015 through June 30, 2022).

3. Payment terms will comply with RFP Section 13.3, which are expected to be consistent with the payment terms and conditions set forth in the existing contracts.

4. Continued effectiveness of the provisions set forth in Section 22.2 and Section 22.3 of the current contract, as introduced by Amendment 70, concerning the assignment of monies due and the granting of security interests.

5. Neustar utilizes a shared operations group that spans the company to support our global infrastructure, corporate-wide product portfolio, and services platform. This infrastructure has been designed to provide services that are reliable, scalable, neutral, and secure. To maximize efficiencies, NPAC/SMS operations are fully integrated into Neustar's overall operations support infrastructure, including general and administrative support functions. Neustar's accounting for costs under this methodology is fully compliant with Generally Accepted Accounting Principles. Therefore, costs and expenses associated with the NPAC/SMS cannot be separately identified or audited in conjunction with VQS Question 3.6.12.

6. The pricing set forth in Neustar's Proposal is a valid quote in accordance with RFP Section 1.7, the terms and conditions of which are subject to being finalized in a definitive agreement between Neustar and the NAPM LLC. If the FoNPAC, NAPM LLC or FCC publicly-announce a recommendation for the selection of another Respondent for any U.S. region or the schedule deviates materially from the dates outlined in RFP Sections 1.5 and 16.1, then Neustar reserves the right to amend its Proposal.

7. All prices are in U.S. Dollars.

8. All prices exclude applicable taxes.

3.8 RFP Pricing Compliance Tables

The following correspond to the Compliance Tables from RFP Section 14.2 and 14.3. These tables are provided for illustrative purposes only and presented to comply with RFP submission requirements. These tables were derived from the terms outlined in Proposal Section 3.

Compliance Tables for Allocable Charges and Direct Charges are set forth in Table 3-18 and Table 3-19 respectively:

Table 3-18 Allocable Charges Pricing Compliance Table (in millions)

	Year 2015-2016	Year 2016-2017	Year 2017-2018	Year 2018-2019	Year 2019-2020	Year 2020-2021	Year 2021-2022
Allocable Industry Flat Fee in U.S. Dollars for All Combined NPAC Regions (a)	HIGHLY CONFIDENTIAL						
Allocable Industry Flat Fee in U.S. Dollars for MidAtlantic NPAC Region	NA	NA	NA	NA	NA	NA	NA
Allocable Industry Flat Fee in U.S. Dollars for MidWest NPAC Region	NA	NA	NA	NA	NA	NA	NA
Allocable Industry Flat Fee in U.S. Dollars for NorthEast NPAC Region	NA	NA	NA	NA	NA	NA	NA
Allocable Industry Flat Fee in U.S. Dollars for SouthEast NPAC Region	NA	NA	NA	NA	NA	NA	NA
Allocable Industry Flat Fee in U.S. Dollars for SouthWest Region	NA	NA	NA	NA	NA	NA	NA
Allocable Industry Flat Fee in U.S. Dollars for West Coast NPAC Region	NA	NA	NA	NA	NA	NA	NA
Allocable Industry Flat Fee in U.S. Dollars for Western NPAC Region	NA	NA	NA	NA	NA	NA	NA
Optional Regional Combination (must identify Regions)	NA	NA	NA	NA	NA	NA	NA

a) *Represents Net Industry Charges reflected in Proposal Section 3.1, Table 3-3 which assumes the Industry earns maximum Incentive Credits*

Table 3-19 Direct Charges Pricing Compliance Table (in dollars)

	Year 2015-2016	Year 2016-2017	Year 2017-2018	Year 2018-2019	Year 2019-2020	Year 2020-2021	Year 2021-2022
1. Any recurring cost per Virtual Private Network (VPN) access to NPAC network (annual)	HIGHLY CONFIDENTIAL						
2. Any recurring cost per Dedicated Mechanized Interface to NPAC network (annual) (a)							
3. Cost per NPAC User manual request support (b)							
4. Cost per standard report requested by User (c)							
5. Cost per ad hoc report requested by User (d)							
6. Any non-recurring cost per log-on ID established (e)							
7. Any non-recurring cost per mechanized interface established (f)							
8. Cost to support new carrier initial LSMS interoperability testing (one time) (f)							
9. Cost to support new carrier initial SOA interoperability testing (one time) (f)							
10. Per hour cost for LNPA test engineer support subsequent to initial system testing (g)							

a) Assumes Dedicated Mechanized Interface to NPAC refers to Dedicated DS-0. See Proposal section 3.4.1 for other Mechanized Interface options

b) Neustar will provide 5 free completed User Support Manual Request transactions per month. Each additional User Support Manual Request will be charged at HIGHLY *per completed request*

c) No charge for standard reports that are accessed via the NPAC Portal. Standard reports that are provided with assistance from Neustar will be billed at HIGHLY *per executed report*

d) No charge for ad hoc reports that are accessed via the NPAC Portal. Ad hoc reports that are provided with assistance from Neustar will be billed at HIGHLY C *per executed report plus* HIGHLY CON *per hour of dedicated support utilized to produce an initial ad hoc report*

e) Neustar will provide 10 free log-on IDs per customer. Each additional log-on ID will be charged at HIGHLY CO *Represents daily rate for all testing categories and turn-up of a mechanized interface*

f) Represents daily rate for all testing categories. See Proposal Section 3.4.3

g) Represents daily rate for testing divided by 8, however all testing will be charged at HIGHLY CONFID *per day. See Proposal Section 3.4.3*

3.9 Billable User Support Manual Request Table

Neustar's complete list of proposed Billable User Support Manual Requests, applied to the applicable section of the Customer Support rate card (Table 3-12) is set forth in Table 3-20.

Table 3-20 Billable User Support Manual Request Table

Category	Description of Request
[redacted]	
Create SV	Old SP asks Help Desk to issue an old SP Create for a TN (or a range of TNs)
[redacted]	
Activate SV	New SP asks Help Desk to issue an Activate for a Pending SV (or SVs, for a range of TNs)
[redacted]	
Modify Pending SV	New SP asks Help Desk to issue a Modify for a Pending SV (or SVs, for a range of TNs)
[redacted]	
Cancel Pending SV	Old SP or New SP asks Help Desk to issue a Cancel for a Pending SV (or SVs, for a range of TNs)
[redacted]	
Modify Active SV	Current SP asks Help Desk to issue Modify for an Active SV (or SVs, for a range of TNs)
[redacted]	
Look Up Network Data	SP asks Help Desk to look up NPA-NXX, NPA-NXX ID, NPA-NXX-X, NPA-NXX-X ID, LRN, or LRN ID to determine associated SPID and/or ID
[redacted]	
Change GUI Password	SP asks Help Desk to change its GUI Password
[redacted]	
Porting Errors (SOW 19)	SP asks Help Desk for help to correct port-in-error and failure-to-port conditions
[redacted]	

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March 20, 2013

North American Portability Management LLC
c/o Dan. A Sciullo Attorney at Law
Berenbaum Weinshienk PC
370 17th Street, Suite 4800
Denver, CO 80202

Re: 2015 LNPA RFP

This letter is to advise you that Neustar is a valued surety client of HIGHLY CONFIDENTIAL . Neustar remains in good standing and is qualified for surety capacity sufficient to support the 2015 Local Number Portability Administrator Master Agreement. The seven proposed performance bonds totaling HIGHLY CONFIDENTIAL would ensure Neustar's prompt and faithful performance under the Master Agreements and User Agreements specifications as required by North American Portability Management LLC.

It is our opinion that Neustar is capable of performing the above captioned project as evidenced by its 16 year track record performing as the Local Number Portability Administrator in the United States, experience on similar projects, and its reputation as one of the country's leading solution providers in the communications industry. Based on our current analysis and due diligence performed, HIGHLY CONFIDENTIAL is confident Neustar is qualified to perform the captioned project but as always, HIGHLY CONFIDENTIAL reserves the right to perform normal underwriting at the time of any final bond requests, including without limitation, prior review and approval of relevant contract documents, bond forms, and the financial condition of our client.

HIGHLY CONFIDENTIAL is "A" rated by A.M. Best, Fitch, and Moody's with a financial size category of XII and is included in The Department of the Treasury's Listing of Certified Companies through HIGHLY CONFIDENTIAL as one of its primary underwriting companies.

HIGHLY CONFIDENTIAL

Estimating the Costs Associated with a Change in Local Number Portability Adminstration

By

Hal J. Singer‡

A transition in local-number-portability administrator would likely impose significant costs on U.S. providers of voice services. According to the cost model developed here, providers would incur approximately $719 million in additional cost in the first year of such a transition. These transition costs would take the form of service credits, hands-on customer service, operations research, and additional system testing. In addition to these costs, greater service delays and errors in porting would likely cause some customers to abandon their switch to a new provider, resulting in additional lost revenue (and increased cost per sale) for the providers that are gaining the most market share from their competitors.

‡ Managing Director and Principal at Navigant Economics. Financial support for this paper was provided by Neustar. The views reflects those of the author only, and do not represent the views of Navigant Economics or its parent company. The author would like to thank Gerry Keith, who developed the cost model, Anna Koyfman, who provided general research, and Kevin Caves, who assisted with the econometric modeling.

I. INTRODUCTION

In August 2012, the Federal Communications Commission (FCC) issued a request for proposal that could lead to a change in the identity of local number portability (LNP) administrator.[1] Any transition involving the handoff from one vendor (or system) to another could encounter difficulties. By way of analogy, FairPoint's transition of its information systems from Verizon (the New England territories) created significant problems that, according to the Maine Public Utility Commission, contributed to FairPoint's subsequent bankruptcy.[2] Similarly, United Airlines encountered severe difficulties in the transition of its reservations systems from the former Continental Airlines in March 2012; despite adding 700 employees, the transition caused United's systems to be overwhelmed, and even resulted in tickets being "lost" in the new system.[3] A full seven months after transition, the system experienced its worst failure to date, a worldwide shutdown that led to cancellations and delays affecting tens of thousands of people.

Such examples show that providers of voice services in the United States ("carriers") would likely incur significant additional costs associated with the transition to a new LNP administrator. The extent of the transition-related errors and their associated costs can be modeled based on, among other things, actual database and transactions volumes, estimates of error rates, the time required to correct the errors, and wage rates.

Working with Gerry Keith,[4] I developed a model to estimate the costs to carriers associated with the transition of LNP services to another vendor. In particular, the regime change assessed here contemplates replacing the current administrator for all LNP transactions, including ports among wireless and wireline carriers. These costs would likely manifest themselves in the form of system transition, transaction processing, system outages, and testing. I conservatively assume that these transition costs are completely mitigated within one year. The model is based on transactional data provided by Neustar to estimate the transition costs.

Carriers typically issue service credits to complaining customers, and they incur customer service expenses and operations research costs when problems are escalated to managers. The extent of the transition-related errors and their associated costs are estimated based on similar experiences in the communications industry. A significant number of batch-update transactions occur because many of the fields in the portability database identify various types of add-on services and third-party providers such as caller ID vendors, which are subject to error. I estimate that Carriers would incur incremental costs of $719 million in the first year of the transition.

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1. FCC Public Notice, Wireline Competitive Bureau Seeks Comment on Procurement Documents for the Local Number Portability (LNP) Administration, DA 12-1333A, released August 12, 2012.

2. *See* FairPoint's SEC Form 10-Q/A for the first quarter, 2009, at 3; Maine Public Utility Commission Examiner's Report, June 3, 2010, Docket No. 2010-76, Docket No. 2010-77, and Docket No. 2010-78.

3. Christopher Elliott, *A chaotic computer switch in United-Continental merger*, CHICAGO TRIBUNE, May 1, 2012, *available at* http://www.chicagotribune.com/travel/sns-201205010000--tms--traveltrctntt-b20120501may01,0,2851270.story.

4. Gerry Keith was the former director of business research at Illinois Bell and has over 30 years of experience in the telephone industry.

II. The Cost Model

There would likely be four sources of errors encountered by carriers during the first year of transition to a new vendor: (1) systems transition (errors introduced during transition when NPAC records are propagated to the carriers); (2) transaction processing (error rates above current baseline due to lack of experience or expertise handling transactions that require customer coordination); (3) unplanned outages (increased probability of LNP service outages that would introduce long LNP porting delays) and (4) testing (testing costs between the new vendor and the carriers plus internal OSS/BSS testing). To simulate the magnitude of these errors, I used industry benchmarks from LNP regimes in transition, as well as Neustar's experience over the past decade with administrating the LNP system in the United States. The magnitude of each error category depended on the end-user experiences. For example, technical errors for features such as caller ID generate smaller costs than errors with call placement.

Each type of error described above could generate three types of incremental costs for carriers: (a) service credits (when customers demand refunds for service delays), (b) hands-on customer service (when customers place service calls), and (c) engineering costs (researching the errors and system testing). Similar to the approach in modeling errors, our approach to modeling error costs relied on industry benchmark figures, as well as Neustar's experience associated with administrating the LNP regime. Table 1 summarizes the most important assumptions relating to these errors.

Table 1: Critical Model Assumptions and Support

Assumption	*Support*
Percentage of Error associated with a simple field	These error rates are similar to those indicated by Alcatel and Lucent in their study.
Number of active fields in database	Actual count of populated fields in the NPAC database
Number of LNP transactions	Actual count of transactions
Complex error rates	Based on a factor applied to Neustar's goals for these types of transactions
Hours to fix errors	Carrier expertise
Employee pay rate	Carrier expertise
Time and cost of carrier testing	Carrier expertise
Additional Outage Times	Neustar's early experience

A. Errors Associated with Database Transition and Operation

A new LNP administrator would likely operate based on the transition of the existing database and LNP system from Neustar. Conversion problems typically arise with transitioning such a database and systems from one vendor's system to another. These problems include the misinterpretation of database fields and database structure by software or personnel. The complexity of various uses of the database and transactions can be shown by the long list in the FCC's RFP of different specifications that the LNP regime

must meet.[5] An example of such errors is the conversion of a public-telephone switched network to an IP network. Alcatel/Lucent found that 1.5 percent of the customers in an ILEC database would generate an error when converting from the public-switched telephone network to an IP network.[6] The basic error rate of one-quarter of a percent per populated field was used to model the NPACs transition to an alternate vendor. This percentage was applied against the number of telephone number records in the NPAC database.

The new LNP administrator would have to operate its system and carrier interfaces with new personnel. These personnel and programs would be relatively inexperienced with new porting requests from carriers—especially those requests involving complex changes associated with mass updates to the database (for example, to change a third-party caller ID vendor). The error rates of a new LNP administrator were partially based on Neustar's performance benchmarks for these types of transactions, while the simpler, market-generated porting transaction error rate was assumed to equal one quarter of one percent per populated field.

B. Estimating the Costs of the Errors, Outage Impacts, and Carrier Testing

The cost of each error was computed for the credit that a carrier may have to provide to the end user, the customer service time, and operations time to research and correct the error. Several factors were used to determine the impact of an error on carrier costs. For example, one factor indicates the percentage of errors that create a direct customer impact for each field, from 100 percent for porting to 0 percent for information-only fields. Other factors determined whether an error would involve a customer credit, the use of customer service time, or operations time to research and correct the error. Other factors estimated the amount of time involved and the associated cost. The model estimates only the impact for the first year of operation and conservatively assumes a declining error rate for transactions during the first year.

Historically, Neustar had higher system outage rates during its early years than in it's most recent years. When the system is down, porting is delayed, which impacts customers and carriers. The impact of this delay is computed by the number of porting transactions affected and the length of the delay using similar factors to the impact of errors, with greater relative impact as outage time increases. The carriers have a number of interfaces with the system to send and receive porting changes.

The carriers would have to test their interfaces with the new vendor to ensure that their systems interface properly as well as test all internal OSS/BSS systems that utilize NPAC data. These costs were estimated based on carrier expertise in such testing.

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5. 2015 LNPA Technical Requirements Document, FCC DA 12-3333A3, released Aug. 26, 2012.
6. Alcatel-Lucent, Solving the NGN Data Migration Challenge (2007), at 2.

C. Results

The results of the model are shown in Table 2.

TABLE 2: MODEL RESULTS (COSTS IN MILLIONS)

Year One Costs ($Millions)	Service Credits	Customer Service	Engineering	Total Year 1 Transition Cost	Percent of Total Cost
Systems Transition	$14.9	$65.4	$102.5	$182.8	25.4%
Transaction Processing	$49.2	$211.6	$189.6	$450.5	62.7%
Outages/ System Unavailability	$0.3	$13.6	$0.7	$14.6	2.0%
Testing	$0.0	$0.0	$71.0	$71.0	9.9%
Total Year One Costs	**$64.5**	**$290.6**	**$363.8**	**$719.0**	**100.0%**
Percent of Total Cost	9.0%	40.4%	50.6%	100.0%	

Only a portion of these costs would be incurred by wireless carriers. Table 3 shows the decomposition of costs by carrier type.

TABLE 3: DECOMPOSITION OF COSTS BY CARRIER TYPE (COSTS IN MILLIONS)

Year One Costs ($Millions)	Service Credits	Customer Service	Engineering	Total Year 1 Transition Cost	Percent of Total Cost
Wireless Costs	$14.1	$97.1	$119.3	$230.6	32.1%
Wireline Costs	$50.4	$193.5	$244.5	$488.4	67.9%
Total	$64.5	$290.6	$363.8	$719.0	100.0%

Table 4 summarizes the impact on customers resulting from the transition.

TABLE 4: CUSTOMER IMPACT SUMMARY (END USERS IN THOUSANDS)

Error Types	Errors Broadcast to End Users	Errors Impacting End Users	End User Complaints	End User Churn (includes abandonment)	% Impacted End User Churn (includes abandonment)	Lifetime Revenue Impact ($M)
Systems Transition	2,737	1,456	1,090	19	1.3%	$38.1
Transaction Processing	6,695	5,350	3,527	140	2.6%	$326.0
Unplanned Outages	-	332	226	50	15.2%	$149.5
Total End Users	9,432	7,138	4,843	209	2.9%	$513.6

According to the model, 7.1 million end users would be impacted by a potential transition—21 percent of whom could not receive phone calls, 72 percent of whom would experience problems with service features, and seven percent of whom could not port their numbers. Additionally, there would be 4.9 million complaints in the form of customer service calls to service providers, and there would be 209,000 end users who would leave their service provider. The lifetime revenue impact to the carriers that lose the opportunity to win these customers would exceed $500 million which is incremental to the $719 million described previously.

D. Sensitivity Testing

I performed several sensitivity analyses by testing the importance of some of the major assumptions underlying the cost model. For example, assuming there were no errors introduced in the transition of the database to another vendor, the impact would be about $200 million less; assuming that any improvement in the handling of the transactions would be offset by errors that were made in the second or later years, the impact would be about $200 million more. To err on the side of conservatism, our model assumed a new vendor would rapidly come up to speed and mitigate most costs by the end of the first year. However, as the United Airlines experience suggests, no amount of preparation would suffice to rapidly mitigate these impacts, and the effects could be significant well after the first year following a transition. Some other assumptions are also highly conservative; for example, if multiple vendors were used, and if a new LNP vendor wrote new code instead of utilizing the existing code held in escrow, then costs in all categories would be significantly greater. The cost model assumes that the new administrator is technically competent and would not encounter as bad a transition as the episodes described in the executive summary.

III. Conclusion

A change in LNP administrator would likely impose significant costs on U.S. carriers. According to the cost model developed here, approximately $719 million in additional cost would accrue to U.S. carriers in the first year of such a transition. These costs would take the form of service credits, hands-on customer service, operations research, and additional system testing. In addition to these costs, greater service delays and errors in porting would likely cause some customers to abandon their switch to a new carrier, resulting in additional lost revenue (and increased cost per sale) from the providers that are gaining the most market share from their competitors.

The model developed here includes very conservative assumptions for error rates and testing costs, it assumes that all inefficiencies are resolved in the first year of the transition, and it does not account for opportunity costs. The latter impact could dwarf the direct costs of transition. Because LNP is fully embedded in core telecom infrastructure, a problematic transition to a new administrator could cause carriers to reallocate resources for many months from the advancement of strategic technology and business priorities to the remedial work of fixing and implementing more controls over the LNP process and repairing relations with consumers. Any such delays could have far-reaching impacts that are difficult to quantify.

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